Assessing Electric Vehicle Charging Infrastructure Needs in California

Implementing Assembly Bill 2127

California Freight Advisory Committee Meeting
April 5, 2019

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California Energy Commission

Assembly Bill 2127 Requirements and Process

- Legislative background and requirements
- Phased process as part of the Energy Commission's Integrated Energy Policy Report (IEPR)
- Details:
  - Data collection methodology and time frame
  - Definitions
  - Planned topics for upcoming AB 2127 workshop on port, airport, and off-road vehicle electrification
- How to engage and assist in these efforts

In Context:
AB 2127 (Ting, Statutes of 2018)

- Address increases in transportation vehicle miles traveled demand and emissions
- Accelerate deployment of 5 million ZEVs and 40% reduction of GHG by 2030
- Transition to a 60% renewable portfolio by 2030 and 100% clean electricity by 2045
- Assess infrastructure needs and enable installation of grid-integrated charging

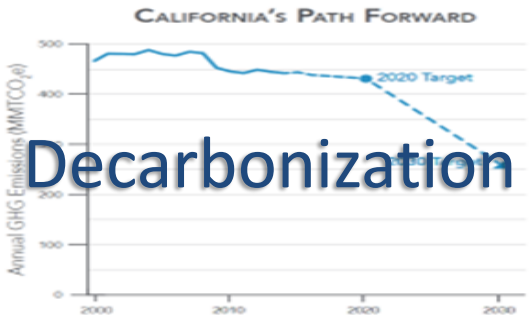
Public Resources Code §25229

- Biennial assessments of statewide charging infrastructure to meet:
  - 5 million ZEVs by 2030
  - Reducing GHG 40% below 1990 by 2030
- Expand upon the CEC's EV infrastructure projections to consider all necessary charging infrastructure:
  - Charging infrastructure
  - Make-ready electrical equipment
  - Hardware and software
  - Other programs to accelerate adoption
- Examine existing and future needs:
  - Throughout California
  - Low-income communities
- Seek data and input from stakeholders:
  - CPUC, CARB, utilities, transportation/transit agencies, environmental groups, manufacturers, and others

All Vehicle Categories

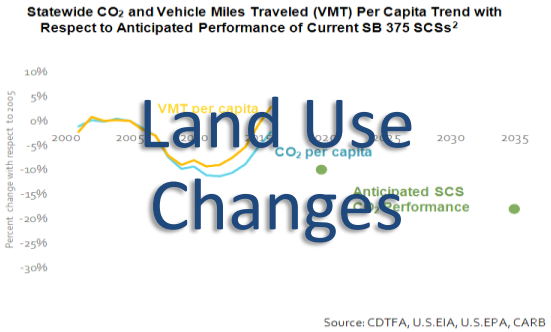
- Road
- Highway
- Off-road
- Port
- Airport

Considerations for Expanded EV Infrastructure Projections

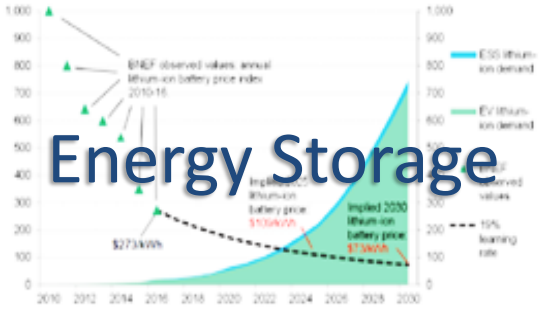


Decarbonization

Vehicle Regulation

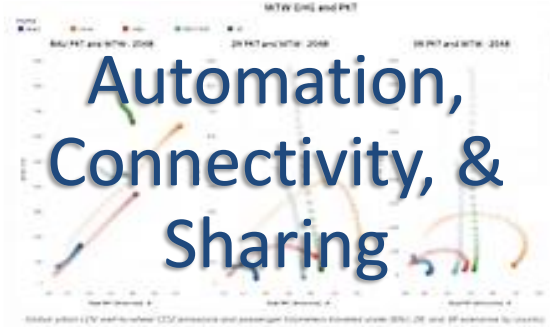


Land Use Changes

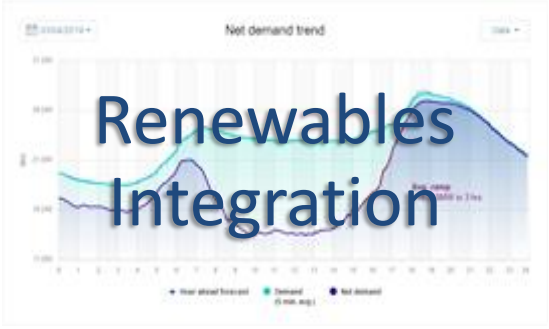


Energy Storage

Charging Technologies



Automation, Connectivity, & Sharing



Renewables Integration

Electric Grid Modernization

IEPR / AB 2127 Phased Process

2019				2020				2021
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1

AB 2127

Ongoing: Development of CEC & researcher technical models

March – May: Scenario development and data collection

May – June: Technical analysis and drafting

January 2020: 1st Report as part of IEPR

December 2020: 2nd Report

IEPR 2019 Workshops

Q2: **- Off-Road, Port, and Airport Electrification (Tentative May 2)**
- Recent Developments in EV Markets (Tentative May 2)
- Grid Impacts of Charging (Tentative May 16)

2020 Update

Ongoing preparations through 2019:
Collection of inputs and assumptions
Model development → Quantitative analyses

Data Collection Methodology

Data Collection

	Type of Data	Comparability?	Confidential?
Forms & Surveys	Quantitative	High	If yes, apply protections
Interviews	Quantitative and Qualitative	Limited. Needs narration.	If yes, apply protections
Workshops & Workgroups	Quantitative and Qualitative	Limited or High. Benefit to public.	No

Analysis

Interagency Scenario Formulation
Technical Assistance (model development, consultant reports)
Findings of Fact
Conclusions and Recommendations

Reporting

AB 2127 Charging Infrastructure Assessment
Transportation Energy Demand Forecast
Vehicle-Grid Integration Roadmap
Assessment of Disproportionate Deployment of Charging Infrastructure (SB 1000, 2018)

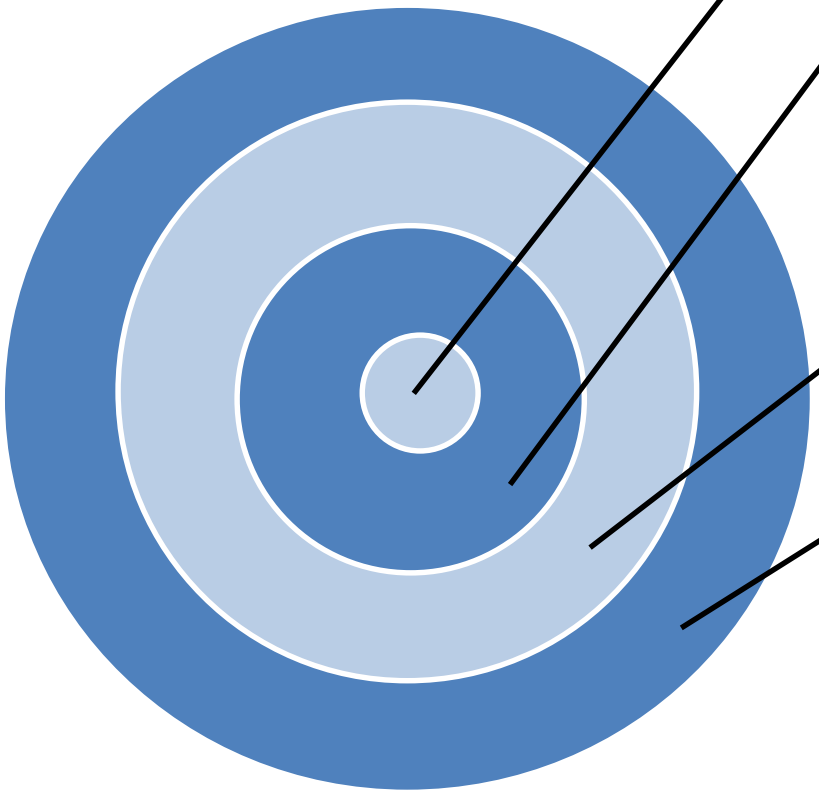
Data and 2019 Timeframe

- Which vehicle sectors or infrastructure elements can feasibly be analyzed during the 2019 IEPR?
  - Stakeholders' data must be incorporated for analysis by mid-May 2019.
- Which areas require additional research and are appropriate for 2020?
- Which topics are of greatest interest to stakeholders, and how could the Energy Commission's analysis be prioritized?

Common Definitions of Charging Infrastructure Elements

- Including but not limited to:
  - Chargers
  - Make-Ready Electrical Equipment
  - Supporting Hardware and Software
  - Other
- What stakeholder terminology or resources may be incorporated?

What is Specifically Meant by The Term “Chargers”?



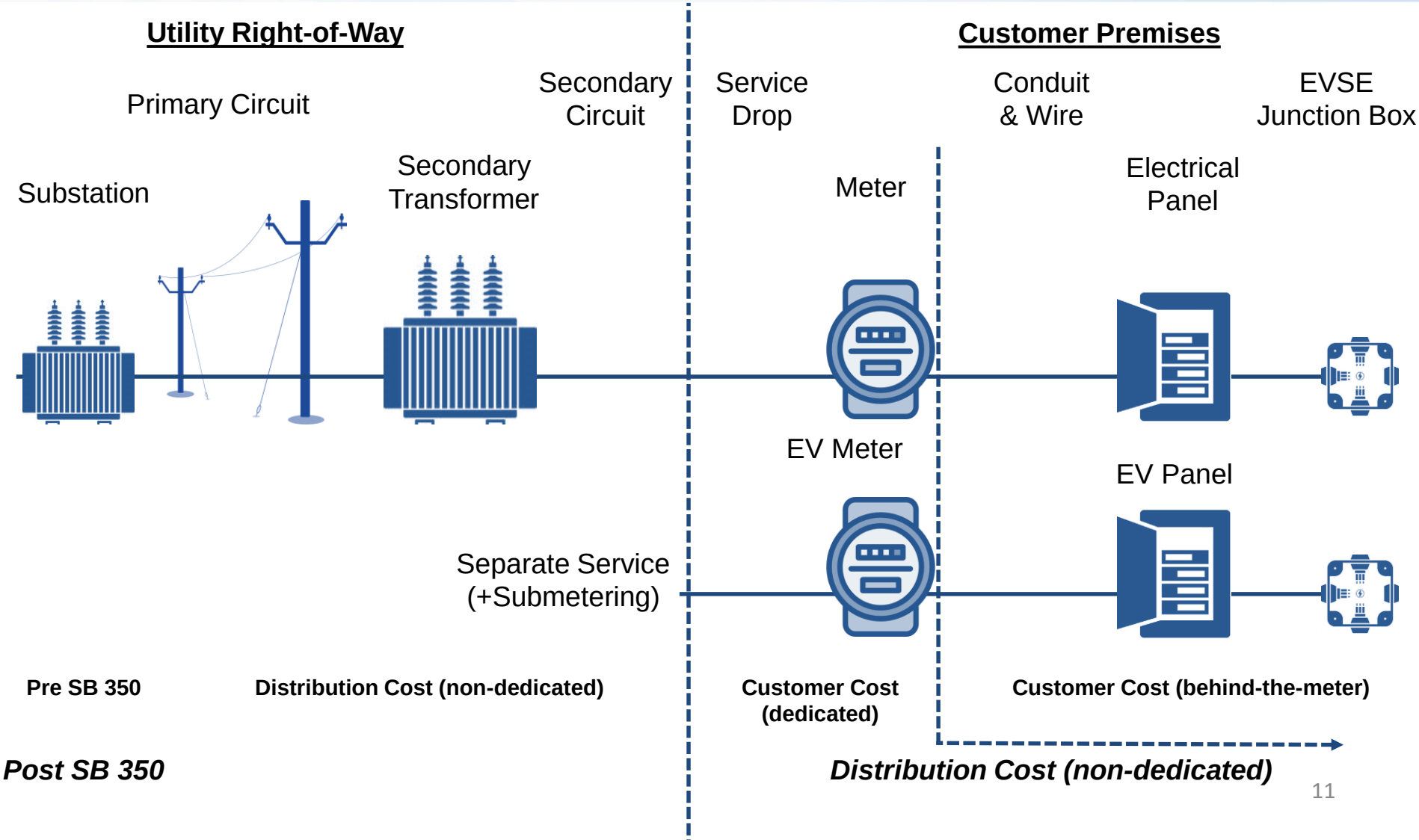
Connector(s)

AC: Electric Vehicle Supply Equipment **or** *DC*: Off-Board Charger

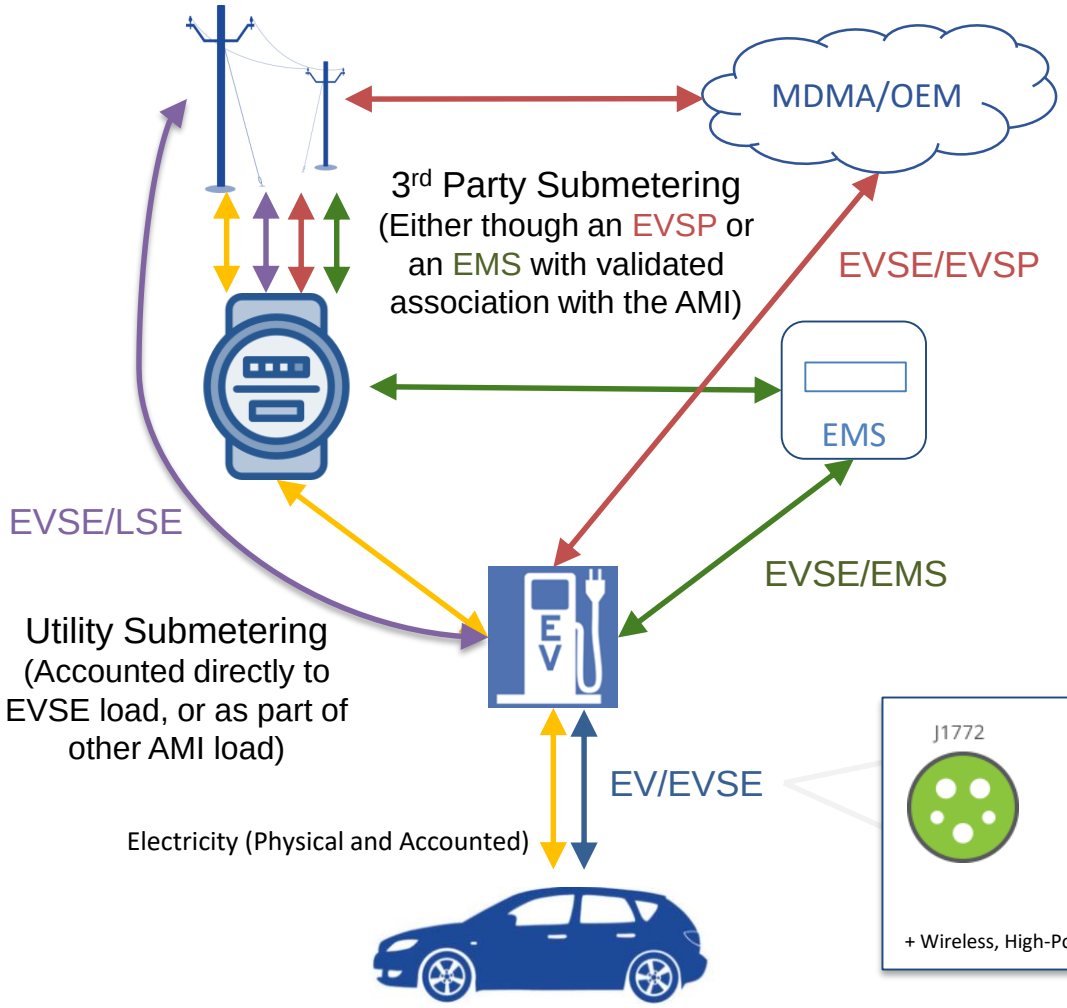
Infrastructure

Station

Make-Ready Electrical Equipment



Hardware and Software



Physical & Transactional

Compatibility
Charging Controls*
Electrical Safety
Meter Accuracy*
Network Connectivity*
Load Efficiency
Secure Authentication*
Secure Payment

+ Others…

* = Vehicle-grid integration related hardware and software requirements

Accounting for Interactions Between Infrastructure Factors

- Capability to offer the needed *charging services*
  - Consider the speed of deploying different asset types that could attain EV deployments and GHG reductions

- Service Resilience
  - P.U. Code §237.5:

"Transportation Electrification" means the use of electricity from ***external sources of electrical power***, including the electrical grid, for all or part of…"

  - Evolving demand and technology leads to emerging charging paths: distributed energy resources, storage, fuel cell, etc.

- Track the pace and breadth of ***other programs***, including existing infrastructure incentives

Emerging Charging Solutions

Illustrations:

- Off-grid PV / energy storage
- Mobile charger
- Automated garage
- Streetlight charger
- Peer-to-peer power transfer

AB 2127 Workshop on Port / Airport / Off-Road Vehicle Electrification

Tentative Date May 2nd – Planned Topics:

- Overview of AB 2127 and definitions
- 2019 update to the 2016 California Off-Road Transportation Electrification Demand Forecast
- California Air Resources Board updates: GHG and criteria air pollutant inventories, regulatory drivers e.g. Advanced Clean Trucks
- Air district mitigation priorities per 2018 air quality attainment plans
- Lessons from ongoing port ZEV demonstrations

Opportunities to Engage

- **The next AB 2127 workshop** will be on off-road, port, and airport electrification and is tentatively planned for **May 2nd, 2019**.

- To receive email updates:

  Sign up for automatic notifications at https://www.energy.ca.gov/listservers/.

  AB 2127-related material will be served to *energypolicy*, *transportation*, *altfuels*, *diversity*, and *dcag*.

Opportunities to Engage

- Written comments: Electronic commenting system for transportation topics in the 2019 IEPR: https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=19-IEPR-04,
- Page with information on AB 2127 and other IEPR topics: https://www.energy.ca.gov/2019_energypolicy/documents/index.html
- Docket log containing presentations, comments, and other materials for IEPR topics related to transportation: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-IEPR-04

Thank you!

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